

CLAIMS

What is claimed is:

1. A transcoder for converting a received first digital signal with a first modulation and encoding scheme to a second digital signal with a second modulation and encoding scheme, the transcoder comprising:

a demodulator that produces a demodulated digital stream of data from the received first digital signal;

a modulator in signal communication with the demodulator, where the modulator modulates the digital stream of data with the second modulation and encoding scheme;

an upconverter in signal communication with the modulator, where the upconverter produces the second digital signal.

2. The transcoder of claim 1, wherein the upconverter includes
an upsampler that receives the first digital signal and produces an upsampled signal;

a complex mixer in signal communication with the upsampler, where the complex mixer is capable of producing an intermediate frequency ("IF") digital signal by upconverting the upsampled signal with an IF carrier signal; and

a digital-to-analog converter ("DAC") in signal communication with the complex mixer, where the DAC is capable of producing the second digital signal having sampling replicas from the IF digital signal.

3. The transcoder of claim 2, wherein the second digital signal may include multiple in-phase and quadrature-phase modulated image replicas.
4. The transcoder of claim 2, wherein a clock signal is input in to both the upsampler and DAC.
5. The transcoder of claim 4, wherein the complex mixer is connected to a numerically controlled oscillator that produces the IF carrier.
6. The transcoder of claim 5, wherein the IF carrier is at a lower frequency than the clock signal.
7. The transcoder of claim 5, wherein the numerically controlled oscillator is an internal component of the transcoder.
8. The transcoder of claim 5, wherein the numerically controlled oscillator is an external component of the transcoder.
9. The transcoder of claim 1, wherein the first modulation and encoding scheme is 8-PSK Turbo Coding.

10. The transcoder of claim 1, wherein the second modulation and encoding scheme is QPSK.

11. A transcoder for converting a received first digital signal with a first modulation and encoding scheme to a second digital signal with a second modulation and encoding scheme, the transcoder comprising:

means for demodulating the received first digital signal to produce a digital stream of data;

means for modulating the digital stream of data with the second modulation and encoding scheme;

means for upconverting the modulated digital stream of data to produce the second digital signal.

12. The transcoder of claim 11, wherein the upconverter means includes means for upsampling the modulated digital stream and producing an upsampled signal;

means for mixing the upsampled signal with a intermediate frequency ("IF") carrier signal to produce an IF digital signal; and

means for converting the IF digital signal to the second digital signal having sampling replicas.

13. The transcoder of claim 11, wherein the second digital signal may include multiple in-phase and quadrature-phase modulated image replicas.

14. The transcoder of claim 11, wherein a clock signal is input in to both the upsampling means and DAC.

15. The transcoder of claim 11, wherein the mixing means is connected to a numerically controlled oscillator that produces the IF.

16. The transcoder of claim 13, wherein the IF is a lower frequency than the clock signal.

17. The transcoder of claim 9, wherein the mixing means is connected to a numerically controlled oscillator that produces an IF carrier that is utilized by the mixing means.

18. The transcoder of claim 17, wherein the IF carrier is at a lower frequency than the clock signal.

19. The transcoder of claim 11, wherein the first modulation and encoding scheme is 8-PSK Turbo Coding.

20. The transcoder of claim 11, wherein the second modulation and encoding scheme is QPSK.

21. A method for converting a received first digital signal with a first modulation and encoding scheme to a second digital signal with a second modulation and encoding scheme, the method comprising:

demodulating the first digital signal;

modulating the demodulated first digital signal with the second modulation and encoding scheme, wherein the modulating produces a new modulated digital signal; and

upconverting the new modulated digital signal to produce the second digital signal.

22. The method of claim 21, wherein the upconverter includes

upsampling the new modulated digital signal;

mixing the upsampled new modulated digital signal with an intermediate frequency ("IF") carrier signal to produce a IF digital signal; and

sampling the IF digital signal through a digital-to-analog converter ("DAC") to produce the second digital signal.

23. The transcoder of claim 21, wherein the first modulation and encoding scheme is 8-PSK Turbo Coding.

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24. The transcoder of claim 21, wherein the second modulation and encoding scheme is QPSK.